



Attendance & Engagement as Predictors for Academic Performance in an Undergraduate Sport & Exercise Science Component Biomechanics Course

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Introduction

- Students encounter a range of challenges that can affect their ability to attend university (Mulligan & Mac an Bhaird, 2026).
- Regular attendance at lectures, laboratories, and workshops is typically expected, and has been associated with improved *component* and *overall* course performance (Doggrell, 2020).
- Engagement with course material may be a more meaningful indicator of learning, than attendance alone (Meng & Zhang, 2023).
- This distinction may be particularly important in biomechanics, as many Sport and Exercise Science (SES) students report negative perceptions of this content (Knudson, 2024).

Aim

- To investigate the contribution of attendance and engagement to academic performance in a biomechanics component course.

Method

- Institutional ethical approval was obtained, and a retrospective cohort design was conducted with consenting penultimate-year SES students (N=45).
- Attendance* data were collected by electronic sign-in, as students scanned a QR code at the start of each delivered session; lectures (N=9), workshops (N=3) and labs (N=2).
- Engagement* was determined as the number of questions attempted in LT Kuracloud (KC) online lessons (N=2).
- Performance* in the end-of-component course assessment (SAQs) was recorded as a grade on a 22-point scale (A1-H).
- Data were confirmed for normality and Pearson correlation, Multiple-Linear Stepwise Regression (MLR) and Principal Component Analyses (PCA) were carried out.

Results

- Correlational analysis showed no single independent variable had a significantly stronger association to course performance than others.
- MLR analysis found the independent variables explained 29% of the variance and KC1 engagement constituted the single most predictive individual variable for course performance (13%).

Variable	Component 1	Component 2
Eigenvalue	2.40	1.04
KC2 Engagement	0.85	0.04
Lab Attendance	0.80	0.31
Lecture Attendance	0.31	0.93
Workshop Attendance	0.37	0.80
KC1 Engagement	0.56	0.12
Variance (%)	48%	21%
Cumulative Variance (%)	48%	69%
Kaiser-Meyer-Olkin: 0.64 Bartlett's Test of Sphericity: $\chi^2 = 54.21$, $p < .001$		

Table 1. PCA Loadings for Engagement and Attendance Variables

- PCA could not identify any individual variables as principal components to explain variance in course performance, however it did identify two components that explain 69% of the variance (Table 1).

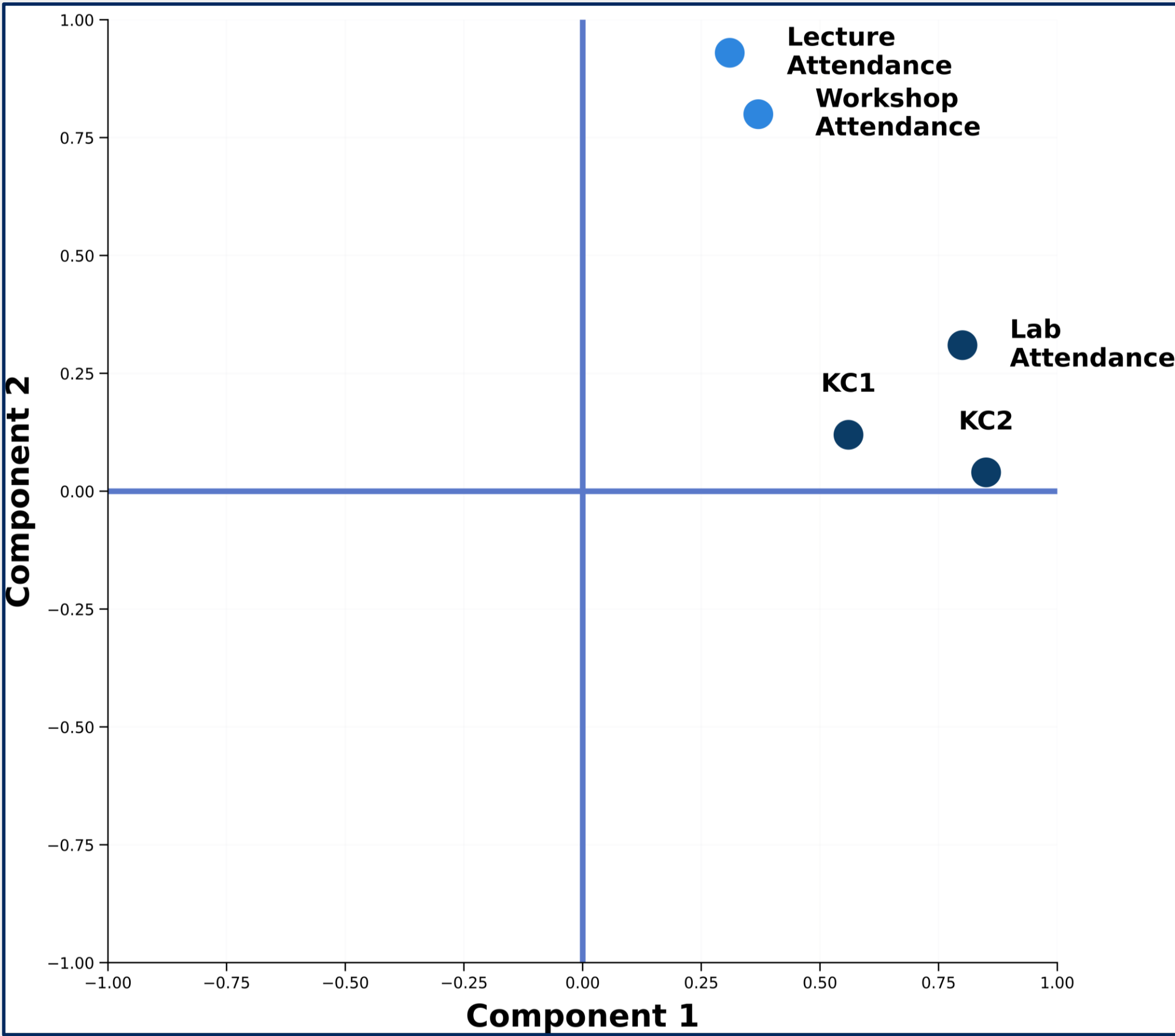


Figure 1. PCA Component Plot of Attendance and Engagement Variables in Rotated Space.

- Component 1* (Eigenvalue = 2.40; 48%) was driven primarily by engagement and attendance variables, including KC2 (0.85) and lab attendance (0.80) (Figure 1).
- Component 2* (Eigenvalue = 1.04; 21%) was characterised by lecture (0.93) and workshop attendance (0.80) (Figure 1).

Discussion

- Both student attendance and engagement predict academic performance in a SES undergraduate component course. This aligns with previous research demonstrating a positive relationship between attendance and assessment outcomes (Gough, 2021).
- Component 1 reflects engagement with interactive and practical learning, while Component 2 reflects classic attendance at theory-driven, instructor-led sessions, with engagement explaining the greatest share of variance.
- These findings indicate that engagement with online activities and practical study, has a stronger influence on performance than attendance alone, highlighting the multifactorial nature of learning.
- Consequently, educators should adopt a range of pedagogical approaches, prioritising interactive engagement and opportunities for practical application within biomechanics teaching.
- Limitations of this work include potential inaccuracies in electronic attendance records and the use of response quantity rather than quality as a measure of engagement. Additionally, a substantial proportion of variance remains unexplained, likely reflecting unmeasured factors such as motivation and prior ability.
- Future research should incorporate these variables and utilise more robust measures of engagement.

Conclusion

- Engagement appears more influential than attendance alone in predicting academic performance. However, performance is multifactorial, highlighting the key role of active learning.

Acknowledgements

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